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| ORGANELLE | Diagnostic Characteristics |
| Mitochondria | Smooth outer membrane  Elongated, spherical or pleomorphic (has various shapes)  Cristae |
| Smooth ER | Composed of slender tubes and small circular vesicles  Can be scattered in cytoplasm but often found in packs of parallel cisternae |
| Rough ER | Interconnecting network of membrane enclosed cisternae and vesicles  Granular nature due to ribosomes  Continuous with nuclear envelope |
| Golgi | Usually located in center of cell close to nucleus and centrosome  Complex, flattened slightly curved sacs  Cis, medial and trans componenets  Cis: convex side, faces nucleus many vesicles  Medial: flattened, curved sacs that do not touch  Trans: faces away from nucleus, concave, composed of vesicles |
| Lysosome | Spherical or irregular shape  Present in most cells, abundant in phagocytes  Can have digested material inside which stains differently, otherwise homogenous dark circle |
| Peroxisome | Spherical to ovoid shape  Smaller than lysosome |
| Inclusion | Glycogen: needs special stain to observe, appears as dark granules  forms rosettes (large clumps of granules)  Lipid Droplets: large spherical blobs, stain a light grey |
| Microtubule | Extremely variable lengths  Semi-rigid cylindrical thin lines |
| Intermediate F | Loose waves that form thick bundles  Rope like structure  Non-membrane bound |
| Centrosome | Non-membrane bound  Usually near nucleus and golgi  2 centrioles oriented at right angles, when cut in cross section appearance like turbines |

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| Epithelial Type | Diagnostic Characteristics | Location |
| Simple Squamous | Nucleus widest part of cell  Ends taper off  Fit together like a jigsaw puzzle | Blood-tissue barriers  Called ENDOTHELIUM in blood vessels and heart tissue  MESOTHELIUM when lining internal cavities like peritoneum |
| Simple Cuboidal | Height ~equal to width  Horizontally cells appear to be a mosaic of polygonal tiles  Nucleus located centrally | Forms conduits for glands  Ovarian surface, renal tubes  Most parenchymal cells of exocrine glands made of this type |
| Simple Columnar | Taller than they are wide  Closely packed slender columns  Nucleus ovoid and located centrally to basally | Major ducts of glands  Convoluted tubule of kidney  Inner lining of stomach, small and large intestine  Small bronchi of lungs  Parts of reproductive tract |
| Pseudostratified | Consists of more than one type of epithelial cell  Nuclei usually appear at 2 or 3 different levels  All cells reach basement membrane but may not reach surface  Basal layer has mitotic potential  More apical cells have elongated nuclei while basal are rounded | Parts of upper respiratory tract  Nasal cavities  Auditory tube  Nasopharynx  Larynx  Trachea  \*\*Mucous goblet cells found in this epithelial layer |
| Stratified Squamous | Multi-layered  Keratinized (no nucleus apical cells)  or un-keratinized (nucleated) | Keratinized: skin cells, outer tympanic membrane, gingival and hard palate in oral cavity  Un-keratinized: most of oral cavity, esophagus, vagina, anus, male and female urethra and cornea |
| Transitional Epithelium | Multi-layered  Commonly called uroepithelium  Non-distended 5-7 cell layers with large “umbrella” cells at surface  Distended 2-3 cell layers | Renal pelvis  Urinary bladder  Ureters  Parts of urethra |

\*\*\* Stratified columnar and cuboidal not common in adult, more common in embryo and fetus

Stratified columnar: pharynx, larynx, major ducts of exocrine glands

Stratified cuboidal: ducts of sweat glands and other exocrine glands